Journal of Pubnursing Sciences, Vol. 02 No. 03 (2024): Hal. 98-107
eISSN 2988-4330; pISSN 3025-3330; DOI: 10.69606/jps.v2i03.150

[Research Article]

Journal of Pubnursing Sciences

Lowering Anxiety and Blood Pressure in Hypertensive Patients with a Combination of Progressive Muscle Relaxation and Binaural Beats Music

Ibnu Cahyono[1], Sentot Imam Suprapto[2], Joko Prasetyo[3]
[1,2,3]Master of Nursing student, STRADA Indonesia University
*Corresponding author: ibnucahyono44@gmail.com

Article Info:

Received: (2024-09-02)

Revised: (2024-09-14)

Approved: (2024-09-24)

Published: (2024-09-29)

Abstract

Hypertension, or high blood pressure, is a non-communicable disease that, if untreated, can lead to severe health issues and even death. Anxiety caused by health problems can contribute to elevated blood pressure at any age. This study analyzed the effects of combining Progressive Muscle Relaxation (PMR) with binaural beats music on anxiety and blood pressure in hypertensive patients. The research used a quasi-experimental design with pretest-posttest control groups and involved 44 hypertensive patients from the Sematu Jaya Health Center, selected through purposive sampling. The independent variable was the combination of PMR and binaural beats music, while the dependent variables were anxiety and blood pressure. Results from the Multivariate Analysis of Variance (MANOVA) showed significant effects on anxiety (p = 0.000, Eta² = 0.690), systolic blood pressure (p = 0.000, Eta² = 0.455), and diastolic blood pressure (p = 0.000, Eta² = 0.516). These findings indicate that the combination of PMR and binaural beats is effective in reducing both anxiety and blood pressure in hypertensive patients. This intervention is simple to implement and can be used as a nursing intervention to improve patient care in health centers.

Keywords: *Progressive Muscle Relaxation, Binaural Beats, Anxiety, Blood Pressure, Hypertension*

Info artikel:

Diterima: (02-09-2024)

Revisi: (14-09-2024)

Disetujui: (24-09-2024)

Publikasi: (29-09-2024)

Abstrak

Hipertensi, atau tekanan darah tinggi, adalah penyakit tidak menular yang dapat memicu berbagai masalah kesehatan jika tidak ditangani dengan baik. Kecemasan akibat penyakit seringkali menjadi penyebab peningkatan tekanan darah di berbagai usia. Penelitian ini menganalisis pengaruh kombinasi Progressive Muscle Relaxation (PMR) dengan iringan musik binaural beats terhadap kecemasan dan tekanan darah pada penderita hipertensi. Penelitian menggunakan metode kuantitatif dengan desain quasy experiment dan pendekatan pretest-posttest control group. Dari populasi 101 pasien hipertensi di Puskesmas Sematu Jaya, dipilih 44 responden secara purposive sampling. Variabel independennya adalah kombinasi PMR dan musik binaural, sedangkan variabel dependennya adalah kecemasan dan tekanan darah. Hasil analisis MANOVA menunjukkan adanya pengaruh signifikan, dengan nilai p 0,000 dan Partial Eta Squared 0,690 untuk kecemasan, p 0,000 dan Partial Eta Squared 0,455 untuk tekanan darah sistole, serta p 0,000 dan Partial Eta Squared 0,516 untuk tekanan darah diastole. Kesimpulannya, kombinasi PMR dengan iringan musik binaural efektif menurunkan kecemasan dan tekanan darah pada penderita hipertensi, dan intervensi ini mudah diterapkan sebagai langkah keperawatan.

Kata kunci: Progressive Muscle Relaxation, Binaural Beats, Kecemasan, Tekanan Darah, Hipertensi

Check for updates

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License, whichallows others to remix, tweak, and build upon the work non-commercially as long as the original work is properly cited. The new creations are not necessarily licensed under the identical terms

Introduction

Hypertension is a non-communicable disease that can lead to various health complications if not managed properly. It is characterized by an elevation in systolic and diastolic blood pressure values beyond normal limits. Specifically, hypertension is defined as blood pressure readings equal to or greater than 140/90 mmHg (Bacha & Abera, 2019). One of the factors contributing to increased blood pressure is anxiety, which can affect individuals of all ages. If left untreated, hypertension can result in serious comorbidities and even death (Nisa et al., 2022). Therefore, in addition to pharmacological treatments, non-pharmacological therapies are essential for

reducing anxiety and controlling blood pressure in hypertensive patients.

According to data from the World Health Organization (2018), approximately 26.4% of the global population suffers from hypertension, with prevalence rates of 26.6% in men and 26.1% in women (Nurkemala & Srifianti, 2019). The prevalence of hypertension is projected to increase to 29% by 2025. In Southeast Asia alone, hypertension accounts for 1.5 million deaths annually, placing a substantial financial burden on healthcare systems (Leung et al., 2022).

In Indonesia, data from the 2018 National Basic Health Research (Riskesdas) survey shows that 60% of hypertension cases occur in developing countries, including Indonesia. The highest prevalence, based on measurements of individuals aged 18 years and older, is found in South Kalimantan Province (44.1%) (Kemenkes RI, 2019). By 2025, it is estimated that 1.5 billion people worldwide will suffer from hypertension, with 10.44 million deaths per year due to hypertension and its related complications (Kemenkes RI, 2021).

Uncontrolled hypertension not only exacerbates complications of other diseases but also leads to psychological problems, such as chronic anxiety. If not managed properly, anxiety can contribute to the development of severe conditions, including stroke, heart attack, heart failure, and chronic kidney disease (Mahyuvi, Pradana, et al., 2023). Hypertensive patients often experience persistent anxiety, which increases sympathetic nervous system activity, further elevating blood pressure. Research by Marliana et al. (2020) supports the significant relationship between anxiety levels and blood pressure, indicating that increased anxiety is associated with higher blood pressure in hypertensive patients.

Anxiety triggers physiological responses, including the release of stress hormones that can increase blood pressure (Marliana et al., 2020). To restore and maintain health, hypertensive patients require effective relaxation techniques, as the immune system and levels of Natural Killer cells are influenced by relaxation patterns (Nurkemala & Srifianti, 2019). Anxiety stimulates the body to produce more adrenaline, thereby increasing cardiac workload and blood pressure, leading to or worsening hypertension (Marbun, 2018).

Addressing hypertension requires a collaborative approach involving healthcare professionals, patients, families, and communities. Health education plays a crucial role in improving treatment outcomes and enhancing the quality of life for hypertensive patients. There are two main types of risk factors for hypertension: non-modifiable factors, such as genetics, age, gender, and ethnicity, and modifiable factors, including anxiety, stress, obesity, and diet (Mrwaha et al., 2022). Poorly managed anxiety can lead to hemodynamic instability in hypertensive patients. In healthy individuals, anxiety can often be managed effectively by identifying its sources and applying techniques such as learning about anxiety, recognizing symptoms, changing behavior patterns, and using relaxation techniques (Sari et al., 2021).

Evidence-based practice highlights several strategies for reducing hypertension, one of which is the combination of Progressive Muscle Relaxation (PMR) and music therapy. PMR, particularly when combined with Binaural Beats music, does not rely on imagination or suggestion, making it highly accessible for patients. The technique involves 15 steps, with each muscle group being tensed for 5–10 seconds, followed by relaxation for 30 seconds. Studies show that PMR reduces anxiety and blood pressure in patients with primary hypertension (Nurkemala & Srifianti, 2019). Similarly, Maqodasah et al. (2023) found that PMR was effective in lowering blood pressure in elderly patients. In addition, Binaural Beats music therapy induces relaxation by modulating brain waves, particularly alpha waves, which are associated with reduced anxiety. Research by Yusim & Grigaitis (2020) and Wulansari et al. (2019) supports the effectiveness of Binaural Beats therapy in reducing anxiety, blood pressure, and pulse rate.

This study introduces the novel approach of combining Progressive Muscle Relaxation with Binaural Beats music therapy to enhance the reduction of anxiety and blood pressure in hypertensive patients.

Methods

This study utilized a quantitative research method with a quasi-experimental design, specifically employing a pretest-posttest control group approach. The population comprised 101 individuals diagnosed with hypertension within the Sematu Jaya Health Center Working Area. A total of 40 respondents were selected as the sample, determined using a sample size formula for hypothesis testing, based on the difference

between two independent means. The proportion of events was derived from Yuliana's 2018 study. The sampling technique used was purposive sampling, with respondents selected based on the following criteria: cooperative patients who consented to participate, hypertensive patients without complications, patients with a Glasgow Coma Scale (GCS) score of 15 or GCS E: 4, V: 5, M: 6, and those experiencing moderate to high levels of anxiety.

The independent variable in this study was the combination of Progressive Muscle Relaxation (PMR) and Binaural Beats music therapy, while the dependent variables were anxiety and blood pressure. The combination of PMR and Binaural Beats music therapy integrates two non-invasive therapies that do not rely on imagination, perseverance, or suggestion, allowing the body to respond effectively. The PMR technique involves 15 sequential movements, where each muscle group is tensed for 5-10 seconds, followed by 30 seconds of relaxation. This therapy was administered to the experimental group for 15-20 minutes per day, once daily, over a period of five days.

Anxiety levels were measured using the Zung Self-Rating Anxiety Scale (SAS) questionnaire, which had been validated with scores ranging from 0.663 to 0.918. The significance level was set at 5% ($p \leq 0.05$), indicating that the questionnaire was valid. Furthermore, the reliability test yielded a Cronbach's alpha value of 0.8, confirming the questionnaire's reliability (Nursalam, 2020). Blood pressure was measured manually using a sphygmomanometer.

This study was conducted in the Sematu Jaya Health Center Working Area in August 2024. Ethical clearance was obtained from the Ethics Committee of STRADA University Indonesia, with approval number 001406/EC/KEPK/I/2024. Statistical analysis was performed using paired t-tests and MANOVA.

Results

Based on Table 1, the homogeneity tests for age, sex, education, and occupation characteristics showed p-values greater than 0.05, indicating no significant differences between the intervention and control groups. The majority of respondents in both groups were between 41 and 60 years old, with 59.1% in the intervention group and 59.1% in the control group, in line with the inclusion criteria. Nearly all respondents in the intervention group (77.3%) were male, and a similar proportion (72.7%) in the control group were also male. Regarding education level, 54.5% of respondents in both the intervention and control groups had an elementary school education. In terms of employment, the majority of respondents in both the intervention group (59.1%) and the control group (63.6%) were unemployed.

Table 2 Results of the Normality Test

Variable	Normality	
	Pre	Post
Anxiety	0,056	0,055
Cistole Blood	0,267	0,085
Diastole Blood Pressure	0,101	0,976

Based on Table 2, all significance (p) values are greater than 0.05, indicating that the dependent variables are normally distributed. Therefore, the Multivariate Analysis of Variance (MANOVA) test can be appropriately conducted.

Table 3 Distribution of analyses of anxiety specific data of hypertensive patients before and after Combination of *Progressive Muscle Relaxation with*

Anxiety Level	Intervention		Control	
	f	%	f	%
Anxiety (Pre)				
No anxiety	-	-	-	-
Light	2	9,1	6	27,3
Keep	18	81,8	14	63,3
Heavy	2	9,1	2	9,1
Anxiety (Post)				
No anxiety	6	27,3	-	-
Light	14	63,3	6	27,3
Keep	2	9,1	14	63,3
Heavy	-	-	2	9,1
Total	**22**	**100**	**22**	**100**

Binaural Beats *Music Accompaniment in the intervention and control groups*

Based on Table 3, prior to receiving the combination of Progressive Muscle Relaxation and Binaural Beats Music Therapy, the majority of respondents in the intervention group (81.8%) experienced moderate anxiety. Following the intervention, most respondents (63.3%) reported mild anxiety. In the control group, the majority of respondents (63.3%) experienced moderate anxiety both before and after the intervention

Tabe1 Age, gender, education and occupation distribution data of respondents

Characteristic Data	Intervention		Control		Homogeneity Test
	Frequency	%	Frequency	%	
Age					
18-40 years old	6	27,3	5	22,7	0,735
41-60 years old	13	59,1	13	59,1	
> 60 years	3	13,6	4	18,2	
Gender					
Man	17	77,3	16	72,7	0,625
Woman	5	22,7	6	27,3	
Education					
No School	-	-	-	-	0,433
Elementery School	12	54,5	12	54,5	
Junior High School	9	40,9	6	27,3	
Senior High School	1	4,5	3	13,6	
College	-	-	1	4,5	
Work					
Work	9	40,9	8	36,4	0,554
Not working	13	59,1	14	63,6	
Sum	**22**	**100**	**22**	**100**	

Table 4 Analysis of the Effect of Combination *of Progressive Muscle Relaxation* with Binaural Beats *Music Accompaniment* on Anxiety of Hypertensive Patients

Group	Mean	N	SD	SE	95% CI	t	p *value*
Anxiety							
Interventions (Pre-Post)	18.045	22	6.786	1.447	15.037-21.054	12.473	0,000
Control (Pre-Post)	1.636	22	4.170	.889	-.212-3.485	1.841	0,080

The results of the analysis of table 4. showed that the stress before and after being given the Combination of Progressive Muscle Relaxation with Binaural Beats Music Accompaniment based on the paired t-test obtained a p value of 0.000 which means that there is an effect of the Combination of Progressive Muscle Relaxation with Binaural Beats Music Accompaniment on anxiety reduction. Based on the paired t-test stress test before and after the standard intervention in the control group, a p value of 0.080 was obtained, which means that there was no significant effect of the standard intervention on reducing anxiety. This shows that there is a significant effect of anxiety reduction in hypertensive patients who are given a combination of Progressive Muscle Relaxation with Binaural Beats Music Accompaniment.

Based on Table 5, prior to receiving the combination of Progressive Muscle Relaxation and Binaural Beats Music Therapy, nearly half (45.5%) of hypertensive patients in the intervention group exhibited pre-hypertension systolic blood pressure. After the intervention, half of the respondents (50.0%) had normal systolic blood pressure. In the control group, before the intervention, 50.0% of the respondents experienced pre-hypertension systolic blood pressure, and following the intervention, most respondents (54.5%) experienced stage I hypertension.

In terms of diastolic blood pressure, nearly half (45.5%) of hypertensive patients in the intervention group showed pre-hypertension before the intervention. After the therapy, 50.0% of the respondents had normal diastolic blood pressure. In the control group, prior to the intervention, 50.0% of respondents experienced pre-hypertension diastolic blood pressure, and after the intervention, the

majority (54.5%) had progressed to stage I hypertension.

Table 5 Distribution of blood pressure analysis of hypertension patients before and after administration Combination of *Progressive Muscle Relaxation with* Binaural Beats Music *Accompaniment* in the intervention and control groups

Blood Pressure	Intervention		Control	
	Frequency (f)	%	Frequency (f)	%
Systole (Pre)				
Normal	-	-	-	-
Pre-Hypertension	10	45,5	11	50,0
Stage 1 hypertension	8	36,4	10	45,5
Stage 2 hypertension	4	18,2	1	4,5
Systole (Post)				
Normal	11	50,0	-	-
Pre-Hypertension	10	45,5	10	45,5
Stage 1 hypertension	1	4,5	12	54,5
Stage 2 hypertension	-	-	-	-
Diastole (Pre)				
Normal	-	-	-	-
Pre-Hypertension	10	45,5	11	50,0
Stage 1 hypertension	8	36,4	10	45,5
Stage 2 hypertension	4	18,2	1	4,5
Diastole (Post)				
Normal	11	50,0	-	-
Pre-Hypertension	10	45,5	10	45,5
Stage 1 hypertension	1	4,5	12	54,5
Stage 2 hypertension	-	-	-	-
Total	22	100	22	

Table 6 Analysis of the effect of the combination of *Progressive Muscle Relaxation* with *Binaural Beats* on blood pressure in hypertensive patients

Group	Mean	N	SD	SE	95% CI	t	p *value*
Systole							
Interventions (Pre-Post)	20.545	22	12.588	2.684	14.964- 26.127	7.656	0,000
Control (Pre-Post)	.500	22	9.679	2.064	-3.792-4.792	.242	0,811
Diastole							
Interventions (Pre-Post)	10.773	22	6.031	1.286	8.099-13.447	8.378	0,000
Control (Pre-Post)	.455	22	3.997	.852	-1.318-2.227	.533	0,599

The analysis results in Table 6 show that systolic blood pressure before and after the intervention with the combination of Progressive Muscle Relaxation and Binaural Beats Music Therapy, based on the paired t-test, yielded a p-value of 0.000. This indicates a significant effect of the combination therapy on reducing systolic blood pressure. In the control group, the paired t-test for systolic blood pressure before and after the standard intervention produced a p-value of 0.811, indicating no significant effect of the standard intervention on systolic blood pressure reduction. These results demonstrate a significant reduction in systolic blood pressure among hypertensive patients receiving the combination of Progressive Muscle Relaxation and Binaural Beats Music Therapy.

Similarly, the analysis results for diastolic blood pressure in Table 6 show that before and after the combination therapy, the paired t-test yielded a p-value of 0.000, indicating a significant effect of the

combination therapy on lowering diastolic blood pressure. In the control group, the paired t-test for diastolic blood pressure before and after the standard intervention produced a p-value of 0.599, showing no significant effect of the standard intervention on diastolic blood pressure reduction. These findings highlight a significant reduction in diastolic blood pressure among hypertensive patients receiving the combination therapy.

Table 7 Results of *Multivariate Analysis of Variant* (MANOVA) anxiety and blood pressure

Variable	*Mean Squared*	F	Sig.	*Partial Eta Squared*
Anxiety	2961.841	93.388	0,000	0,690
Blood Pressure Systoles	4420.023	35.060	0,000	0,455
Diastole blood pressure	1171.114	44.743	0,000	0,516

Based on table 7. The results of the Multivariate Analysis of Variant (MANOVA) analysis showed that anxiety p value 0.000 and Partial Eta Squared value 0.690, systole blood pressure p value 0.000 and Partial Eta Squared value 0.455, diastole blood pressure p value 0.000 and Partial Eta Squared value 0.516 which means that there is an Effect of Progressive Muscle Relaxation Combination with Binaural Beats Music Accompaniment on anxiety and blood pressure of hypertensive patients. Of the three variables that were most affected by the Combination of Progressive Muscle Relaxation with Binaural Beats Music Accompaniment, the anxiety variable was evidenced by the highest value of Partial Eta Squared 0.690.

Discussion

Differences in Anxiety Among Hypertensive Patients Using Progressive Muscle Relaxation and Binaural Beats Music

The study results indicate a significant reduction in anxiety among hypertensive patients following the combination of Progressive Muscle Relaxation (PMR) with Binaural Beats Music Accompaniment. This finding aligns with prior research (Youssef et al., 2019; Nasihin et al., 2022; Israinawati et al., 2023), which highlights the effectiveness of PMR in alleviating anxiety in hypertensive patients. Similarly, other studies (Yusim & Grigaitis, 2020; Rankhambe & Ainapure, 2022) have demonstrated the anxiety-reducing effects of Binaural Beats music therapy.

Anxiety is often characterized by nonspecific feelings of unease, accompanied by somatic symptoms indicative of excessive physiological arousal (Donelli et al., 2019). It manifests as vague fear and is often disconnected from any tangible or threatening situation (Thoyibah et al., 2019). In hypertensive patients, anxiety can arise at any time, particularly when they encounter new or stressful experiences. This anxiety is frequently associated with feelings of uncertainty, discomfort, and isolation stemming from their hypertensive condition (Ibrahim et al., 2019).

Several factors contribute to anxiety in hypertensive patients, including sleep disturbances, impaired focus, reduced productivity, and fears related to the stigma and potential consequences of the disease (Fiari et al., 2023). Given the holistic nature of the physical and psychological challenges faced by hypertensive patients, comprehensive treatment approaches are essential (Novita et al., 2023). The combination of PMR with Binaural Beats Music Accompaniment is particularly effective in addressing the anxiety these patients experience, ultimately improving their overall quality of life.

The anxiety experienced by hypertensive patients often stems from feelings of helplessness and uncertainty, which can worsen in challenging situations. When confronted with potential comorbidities or the progression of their condition, patients' anxiety may intensify, heightening the risk of severe health complications, including death. It is therefore essential to anticipate and manage anxiety effectively to maintain the health and well-being of hypertensive patients (Mahyuvi, Pradana et al., 2023). Early identification of factors influencing anxiety can lead to better management strategies, including innovative preventive and therapeutic interventions (Mahyuvi, Katmini et al., 2023).

Anxiety in hypertensive patients can be effectively managed using non-pharmacological complementary therapies. The combination of PMR with Binaural Beats Music Accompaniment offers a unique therapeutic approach that does not require imagination or suggestion, allowing the body to respond naturally. PMR involves a series of 15 muscle movements, each held under tension for 5–10 seconds, followed by 30 seconds of relaxation. This process, lasting 15–20 minutes per session, is typically performed once a day over five consecutive days. The

involvement of all five senses during relaxation promotes a sense of calm, balancing the mind, body, and soul. Additionally, this combined therapy has been shown to increase the production of endorphins, improving mood and reducing anxiety in hypertensive patients (Youssef et al., 2019; Nasihin et al., 2022; Isrianawati et al., 2023).

Regular and consistent implementation of this complementary therapy can effectively reduce anxiety in hypertensive patients. Key factors influencing the success of this intervention include age, education, and occupation, as these variables impact patients' receptiveness to PMR with Binaural Beats Music Accompaniment. Life experiences also shape patients' perceptions and responses to anxiety, emphasizing the importance of a tailored approach to therapy. The combination of PMR and Binaural Beats Music Accompaniment provides a significant reduction in anxiety and can serve as a valuable non-pharmacological tool in managing anxiety for hypertensive patients.

Difference in Blood Pressure of Hypertensive Patients Using Progressive Muscle Relaxation and Binaural Beats Music Accompaniment

The results of this study indicate a significant effect of the combination of Progressive Muscle Relaxation (PMR) with Binaural Beats Music Accompaniment on the reduction of both systolic and diastolic blood pressure in hypertensive patients. This finding is consistent with previous research (Kusumawaty et al., 2021; Abbasiah et al., 2023), which demonstrated that PMR interventions can effectively lower elevated blood pressure. Additionally, Wulansari et al. (2019) found that music therapy contributes to reductions in blood pressure among hypertensive individuals.

Hypertension is a condition characterized by elevated blood pressure, which increases the risk of cardiovascular diseases (Mahyuvi et al., 2024). Management of hypertension typically involves lifestyle modifications, dietary changes, and relaxation therapies. The combination of PMR with Binaural Beats Music Accompaniment serves as an effective non-pharmacological intervention for lowering blood pressure. This technique enhances blood circulation, alleviates muscle tension, and stimulates the parasympathetic nervous system, resulting in a decreased heart rate and subsequent vasodilation, which lowers blood pressure. The relaxation and stress-reduction effects of this combination contribute to decreased sympathetic nervous system activity and increased parasympathetic nervous system activity, both of which are associated with lowered blood pressure. Furthermore, muscle relaxation and the calming effects of lavender may promote vasodilation, reducing peripheral resistance and further lowering blood pressure (Youssef et al., 2019).

Activation of the parasympathetic nervous system and a reduction in sympathetic activity directly contribute to decreased blood pressure and heart rate, promoting a more stable physiological state and reducing stress on the cardiovascular system (Abbasiah et al., 2023). The combination of PMR with Binaural Beats Music Accompaniment exhibits a robust mechanism, empirically validated for its effectiveness in lowering blood pressure in hypertensive patients. The underlying mechanisms include stress reduction, decreased levels of stress hormones, vasodilation, and increased parasympathetic nervous system activity. Consequently, this combination therapy represents a valuable component of non-pharmacological approaches to hypertension management, particularly for individuals seeking natural and holistic treatment options (Yusim & Grigaitis, 2020).

Effect of the Combination of Progressive Muscle Relaxation with Binaural Beats Music Accompaniment on Anxiety and Blood Pressure in Hypertensive Patients

The results of this study indicate that the combination of Progressive Muscle Relaxation (PMR) with Binaural Beats Music Accompaniment significantly affects both anxiety and blood pressure in hypertensive patients. Among the three variables examined, anxiety was found to be the most influential factor. Hypertension is a medical condition frequently influenced by psychological factors, such as stress and anxiety. Studies have shown that increased anxiety can trigger spikes in blood pressure, thereby exacerbating the condition of hypertension (Mahyuvi, Prasetyo, et al., 2023). Consequently, a non-pharmacological approach aimed at reducing anxiety holds significant potential for hypertension management. One such approach is the combination of PMR with Binaural Beats music

accompaniment.

Progressive Muscle Relaxation (PMR) is a relaxation technique involving the systematic contraction and relaxation of specific muscle groups. This method aims to reduce muscle tension and foster a sense of physical and mental relaxation (Israinawati et al., 2023). In the context of hypertension, the muscle relaxation induced by PMR can mitigate the body's stress response, contributing to lower blood pressure. Research indicates that PMR activates the parasympathetic nervous system, which plays a critical role in lowering heart rate and facilitating vasodilation (the dilation of blood vessels), thereby reducing blood pressure (Desinta et al., 2023).

Binaural beats represent an acoustic phenomenon that occurs when two notes with slightly different frequencies are presented separately to each ear. The brain responds by producing new waves known as "binaural beats," which are believed to influence brain activity and promote relaxation. Specific frequencies of binaural beats, such as alpha waves (8-12 Hz), are associated with mild states of relaxation and decreased anxiety (Rankhambe & Ainapure, 2022).

The combination of PMR and binaural beats operates through several interconnected mechanisms. First, the PMR technique directly reduces muscle tension and stress, leading to activation of the parasympathetic nervous system and a decrease in sympathetic nervous system activity. This activation promotes vasodilation, lowers peripheral vascular resistance, and ultimately reduces blood pressure (Hafid, 2022).

Second, binaural beats enhance the effectiveness of PMR by amplifying the relaxation response. Binaural music can induce deeper states of meditation or relaxation, contributing to decreased anxiety and improved mental well-being. By lowering anxiety, the body's stress response diminishes, which in turn aids in lowering blood pressure (Nurkemala & Srifianti, 2019).

The combination of PMR with Binaural Beats Music Accompaniment can be integrated into a holistic hypertension management program. This therapy may serve as an alternative or complementary option for patients who experience side effects from antihypertensive medications or seek a more natural treatment approach. Furthermore, regular use of this technique can help patients develop more effective coping strategies for managing anxiety, which is often a significant trigger for blood pressure spikes in individuals with hypertension.

Conclusion

The combination of PMR with binaural music accompaniment is effective in reducing anxiety and blood pressure in hypertensive patients, and this intervention is easy to implement as an innovative nursing service to improve the quality of services.

Acknowledgments

All researchers expressed their gratitude to the STRADA Indonesia University and the in the Sematu Jaya Health Center for supporting the implementation of this research.

Conflicts of Interest

In completing this research there is no conflict of interest.

References

Abbasiah, Ernawati, & Novianti, R. (2023). The Effect Of Progressive Muscle Relaxation On Blood Pressure And Anxiety Of Hypertension Patients. Proceeding International Conference of Health Polytechnic of Jambi, 1, 2023–2066. http://journal.poltekkesjambi.ac.id/index.php/

Bacha, D., & Abera, H. (2019). Knowledge, Attitude and Self-Care Practice towards Control of Hypertension among Hypertensive Patients on Follow-up at St. Paul's Hospital, Addis Ababa. Ethiopian Journal of Health Sciences, 29(4), 421–430. https://doi.org/10.4314/ejhs.v29i4.2

Desinta, R., Surya, D. O., Yeni, G. P., Amardya, V., & Maiga, E. (2023). Edukasi Terapi Progressive Muscle Relaxation (PMR) untuk Mengontrol Tekanan Darah pada Lansia Hipertensi. Jurnal Abdi Mercusuar, 3(1), 001–006. https://doi.org/10.36984/jam.v3i1.337

Donelli, D., Antonelli, M., Bellinazzi, C., Gensini, G. F., & Firenzuoli, F. (2019). Effects of lavender on anxiety: A systematic review and meta-analysis. In Phytomedicine (Vol. 65). Elsevier GmbH. https://doi.org/10.1016/j.phymed.2019.153099

Fiari, D. A. A., Aini, N., Octary, T., Arfianto, M. A., & Husna, C. H. Al. (2023). The Effectiveness of Spiritual Therapy in Reducing the Anxiety Level of Preoperative Patients. KnE Medicine. https://doi.org/10.18502/kme.v3i2.13076

Hafid, M. A. (2022). The Effectiveness of Progressive Muscle Relaxation Therapy and Guided Imagery Techniques for Reducing Blood Pressure in Hypertension Patients. Open Access Macedonian Journal of Medical Sciences, 10(G), 689–693. https://doi.org/10.3889/oamjms.2022.9806

Ibrahim, A., Koyuncu, G., Koyuncu, N., Suzer, N. E., Cakir, O. D., & Karcioglu, O. (2019). The effect of Benson relaxation method on anxiety in the emergency care. Medicine (United States), 98(21). https://doi.org/10.1097/MD.0000000000015452

Isrianawati, E., Rusdianingseh, R., Hatmanti, N. M., & Khafid, M. (2023). Application Of Progressive Muscle Relaxation To Reducing The Anxiety Of Hypertension Clients. Nurse and Holistic Care, 3(1), 21–25. https://doi.org/10.33086/nhc.v3i1.3935

Jubaedah, & Pratiwi, A. (2021). Kemampuan Koping Dengan Tingkat Kecemasan Klien Hipertensi. Adi Husada Nursing Journal, 7(2), 99–106.

Kemenkes RI. (2019). Hasil Utama Riset Kesehatan Dasar Tahun 2018. Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan.

Kemenkes RI. (2021). Profil Kesehatan Indonesia 2021. Kementerian Kesehatan Republik Indonesia.

Leung, A. A., Williams, J. V. A., Tran, K. C., & Padwal, R. S. (2022). Epidemiology of Resistant Hypertension in Canada. Canadian Journal of Cardiology, 38(5), 681–687. https://doi.org/10.1016/j.cjca.2022.01.029

Mahyuvi, T., Fanani, M., Indasah, & Joko Prasetyo. (2024). Self Management berbasis Pemberdayaan Komunitas untuk Meningkatkan Kualitas Hidup Penderita Hipertensi. Tata Mutiara Hidup Indonesia.

Mahyuvi, T., Katmini, Indasah, & Prasetyo, J. (2023). Mengenali dan Mencegah Hipertensi di Masyarakat. Tata Mutiara Hidup Indonesia.

Mahyuvi, T., Pradana, A. F., Indasah, & Prasetyo, J. (2023). Recognizing and Preventing Hypertension in the Community. Tata Mutiara Hidup Indonesia.

Mahyuvi, T., Prasetyo, J., Puspitasari, Y., Amar, M., & Kristiya Marta, D. (2023). Counseling: Improving Hypertension Handling Behavior in the Public. Jurnal Abdi Masyarakat, 7(1), 30–36. https://doi.org/10.30737/jaim.v7i1.5018.

Maqodasah, S. M., Naralia, T. W., & Wahyuvingsih, S. A. (2023). Studi Kasus Penerapan Terapi Relaksasi Otot Progresif (ROP) untuk Menurunkan Tekanan Darah Tinggi Pada Lansia di Slipi. Jurnal Keperawatan Degeneratif, 01(1). http://ejournal.akper-pelni.ac.id/index.php/jkp

Marbun, E. V. Y. (2018). Pengaruh Progressive Muscle Relaxation terhadap Tekanan Darah pada Lansia di Gereja Santa Theresia Perumnas Simalingkar Medan [SKRIPSI]. STIKes Santa Elisabeth.

Marliana, T., Kaban, I. S., & Chasanah, U. (2020). Hubungan Kecemasan Lansia Dengan Hipertensi Di Puskesmas Kecamatan Kramat Jati Jakarta Timur. Konas Jiwa XVI Lampung, 306.

Mrwaha, S. F., Evelianti, M., & Wowor, T. J. (2022). Faktor-Faktor Yang Berhubungan Dengan Kejadian Hipertensi Usia Dewasa Pada Masa Pandemi Covid-19 Di Kelurahan Pabuaran Cibinong Bogor. Jurnal Keperawatan, 10(1), 45–52.

Nisa, A. H., Saputri, A. D., Fadila, A. N., Piningit, B. F. A., & Putri, B. K. (2022). Evidence Based Nursing Efektifitas Progressive Muscle Relaxation Therapy Terhadap Tekanan Darah Pada Pasien Hipertensi Di Ruang Rawat Inap Aster RSUD Dr. Haryoto Lumajang [Karya Ilmiah]. Universitas dr.Soebandi.

Novita, M., Luh Emilia, N., Alfira Yunita Assa, A., & Wahyu Purwanza, S. (2023). Application of Benson's Relaxation Therapy to Reducing Anxiety in Patients Hypertension: Case Study. Adi Husada Nursing Journal, 9. https://doi.org/10.37036/ahnj.v9i1.387

Nurkemala, S., & Srifianti. (2019). Pengaruh Progressive Muscle Relaxation Training Terhadap Taraf Kecemasan Dan Tekanan Darah Tinggi pada Penderita Hipertensi Primer. Jurnal Psikologi : Media Ilmiah Psikologi.

Rankhambe, D., & Ainapure, B. (2022). Effect Of Binaural Beats Music Therapy On Anxiety Via Eeg Using Ann & Machine Learning-A Survey. Journal of Theoretical and Applied Information Technology, 15(3). www.jatit.org

Sari, R. Y., Muhith, A., Rohmawati, R., Soleha, U., Faizah, I., Afiyah, R. K., & Rahman, F. S. (2021). Spiritual emotional freedom technique against anxiety and psychological well-being of type 2 dm patients during the covid-19 pandemic. Open Access Macedonian Journal of Medical Sciences, 9, 260–265.

https://doi.org/10.3889/oamjms.2021.7217

Thoyibah, Z., Purqoti, D. N. S., & Oktaviana, E. (2019). Spiritual counseling on anxiety level in (Lombok) Indonesian earthquake victims. Malahayati International Journal of Nursing and Health Science, 2(2), 92–99. https://doi.org/10.33024/minh.v2i2.2208

Wulansari, D., Binarto, J., Hadikrishna, I., & Sjamsudin, E. (2019). Pengaruh Terapi Musik Relaksasi Binaural-Beat Terhadap Tekanan Darah dan Denyut Nadi Pada Pasien Pra Ekstraksi Gigi. Jurnal Pengabdian Kepada Masyarakat.

Youssef, J., Abdelsaid, G., Mostafa El-Geneidy, M., Maximos, M. H., Magdy, R., & Abd El-Salam, M. (2019). Effect of Progressive Muscle Relaxation Technique on Blood Pressure, Anxiety and Stress among Elders in Assisted Living Facilities. In Progressive Muscle Relaxation, Elders' Blood Pressure (Vol. 21, Issue 2).

Yusim, A., & Grigaitis, J. (2020). Efficacy of Binaural Beat Meditation Technology for Treating Anxiety Symptoms: A Pilot Study. Journal of Nervous and Mental Disease, 208(2), 155–160. https://doi.org/10.1097/NMD.0000000000001070